What is claimed is:

1. A multiple degree-of-freedom motor comprising:

an output shaft;

a stator comprising first and second lamination stacks, each said lamination stack having an interior curved surface and a coil wound thereon, said lamination stacks being disposed adjacent said output shaft; and

a rotor fixed to said output shaft and movably supported adjacent said stator with an air gap disposed between said rotor and said stator, said rotor including at least one magnet disposed thereon and being movable along said interior curved surface of said lamination stacks in directions defining at least first and second degrees of freedom;

wherein energization of the coil of said first lamination stack establishes a first magnetic field to urge said output shaft to rotate in a first plane, and wherein energization of the coil of said second lamination stack establishes a second magnetic field to urge said output shaft to rotate in a second plane substantially orthogonal to the first plane.

2. The motor of claim 1, wherein said first degree of freedom is substantially perpendicular to a longitudinal axis of wires of one of said coils associated with the first degree of freedom, and said second degree of freedom is substantially perpendicular to a longitudinal axis of wires of the other of said coils.

3. The motor of claim 1, wherein said interior curved surface substantially defines at least a portion of a sphere.

4. The motor of claim 1, wherein said curved interior surface is uniformly curved.

5. The motor of claim 1, wherein said interior curved surface has a plurality of slots formed therein.

6. The motor of claim 5, wherein said slots lie in planes substantially parallel to one another.

7. The motor of claim 1, wherein at least one said lamination stack comprises a plurality of laminations radially disposed about a center point, with a plane of each lamination extending through said center point.

8. The motor of claim 1, wherein at least one said lamination stack has an interior curved surface with no slots formed therein.

9. The motor of claim 1, wherein at least one said magnet is a permanent magnet.

10. The motor of claim 1, wherein at least one said magnet is faceted.

11. The motor of claim 1, wherein the output shaft is also an input shaft.

12. The motor of claim 11, further comprising at least one sensor for detecting movement of said input shaft.

13. The motor of claim 1, further comprising a cooling fan.

14. The motor of claim 1, further comprising a communications interface for providing input and/or output signals to detect and/or control the position of said output shaft.

15. The motor of claim 1, wherein said stator further comprises a third lamination stack having an interior curved surface and a coil wound thereon;

wherein said rotor includes at least one magnet disposed thereon and being movable along said interior curved surface of said third lamination stack in a direction defining a third degree of freedom;

wherein energization of the coil of said third lamination stack establishes a third magnetic field to urge said output shaft to rotate in a third plane substantially orthogonal to each of said first and second planes.

16. The motor of claim 15, wherein said third lamination stack has slots formed therein, said slots lying in planes substantially parallel to one another.

17. A multiple degree-of-freedom motor comprising:

an output shaft;

first and second stator coils disposed adjacent said output shaft;

a rotor fixed to said output shaft and movably supported adjacent said stator coils with an air gap disposed between said rotor and said stator coils, said rotor including at least one magnet disposed thereon and being movable in directions defining at least first and second degrees of freedom;

wherein energization of the first stator coil establishes a first magnetic field to urge said output shaft to rotate in a first plane, and wherein energization of the second stator coil establishes a second magnetic field to urge said output shaft to rotate in a second plane substantially orthogonal to the first plane.

18. The motor of claim 17, wherein said first degree of freedom is substantially perpendicular to a longitudinal axis of wires of said first stator coil

associated with the first degree of freedom, and said second degree of freedom is substantially perpendicular to a longitudinal axis of wires of said second stator coil.

19. The motor of claim 17, wherein at least one said magnet is a permanent magnet.

20. The motor of claim 17, wherein at least one said magnet is faceted.

21. The motor of claim 17, wherein the output shaft is also an input shaft.

22. The motor of claim 21, further comprising at least one sensor for detecting movement of said input shaft.

23. The motor of claim 17, wherein said stator further comprises a third coil;

wherein said rotor includes at least one magnet disposed thereon and being movable in a direction defining a third degree of freedom;

wherein energization of the third stator coil establishes a third magnetic field to urge said output shaft to rotate in a third plane substantially orthogonal to each of said first and second planes.

24. A method of moving an output shaft in multiple degrees of freedom, said method comprising:

disposing first and second stator coils adjacent said output shaft;

fixing a rotor to said output shaft, said rotor being movably supported adjacent said stator coils with an air gap disposed between said rotor and said stator coils, said rotor including at least one magnet disposed thereon and being movable in directions defining at least first and second degrees of freedom; and

urging said output shaft to rotate in one of a first and second plane by respectively energizing the first or second stator coil, wherein said energization of the respective stator coils establishes magnetic fields to urge said output shaft to rotate in planes substantially orthogonal to one another.

25 The method of claim 24, wherein at least one said magnet is faceted.

26. The method of claim 24, further comprising:

disposing a third stator coil adjacent said output shaft;

fixing said rotor so as to include at least one magnet disposed thereon and being movable in a direction defining a third degree of freedom; and

urging said output shaft to rotate in a third plane by energizing the third stator coil, wherein said energization of the third stator coil establishes a third magnetic field to

urge said output shaft to rotate in a third plane substantially orthogonal to each of said first and second planes.

27. A lamination stack for use in a stator of a motor having an output shaft, comprising:

a plurality of laminations stacked flat against one another and parallel to one another;

wherein the laminations near the edge of the stack are disposed slightly closer to the output shaft to form a stepped concave surface about the longitudinal axis of the output shaft in a plane orthogonal to a side surface of the plurality of laminations.

28. The lamination stack of claim 27, wherein the shape of the stepped concave surface of the plurality of laminations about an equator of the plurality of laminations approximates an arc having a constant radius in a plane orthogonal to a side surface of the plurality of laminations.

29. A multiple degree-of-freedom motor comprising:

an output shaft:

a rotor coupled to the output shaft; and

a stator comprising a first lamination stack and a second lamination stack, said lamination stacks disposed perpendicular to one another, each lamination stack having a curved interior surface and a coil wound thereon; and

wherein the laminations of the first lamination stack and second lamination stack are substantially parallel to one another.

30. The motor of claim 29, wherein energization of the coil of the first lamination stack establishes a first magnetic field to urge said output shaft to rotate in a first plane, and wherein energization of the coil of the second lamination stack establishes a second magnetic field to urge said output shaft to rotate in a second plane.

31. The motor of claim 29, wherein said stator further comprises a third lamination stack having an interior curved surface and a coil wound thereon;

wherein the laminations of the first and second lamination stacks are substantially perpendicular to the laminations of the third lamination stack; and

wherein energization of the coil of the third lamination stack establishes a third magnetic field to urge said output shaft to rotate in a third plane substantially orthogonal to said first and second planes.

32. A stator coil winding for use in a motor comprising an output shaft having a rotor coupled thereto and a longitudinal axis, said winding comprising:

a spiral coil having a plurality of turns therein, wherein said coil is disposed adjacent said output shaft and is wound around an axis generally parallel to the longitudinal axis of said output shaft.

33. The stator coil winding of claim 32, wherein said spiral coil is disposed relative to said rotor such that torque control over said output shaft in a degree of freedom is exerted by selective provision of a current having a predetermined direction and magnitude to said spiral coil.

34. The stator coil winding of claim 32, wherein said spiral coil is wound around a lamination stack.

35. The stator coil winding of claim 34, wherein said lamination stack has an interior curved surface.

36. The stator coil winding of claim 34, wherein said lamination stack has a plurality of slots formed therein.

37. The stator coil winding of claim 36, wherein said slots lie in planes substantially parallel to one another.

38. The stator coil winding of claim 36, wherein said lamination stack comprises a plurality of laminations radially disposed about a center point, with a plane of each lamination extending through said center point.

39. The stator coil winding of claim 36, wherein said lamination stack has no slots formed therein.

40. The stator coil winding of claim 36, wherein said spiral coil is wound around a single solid ferrite mass.

41. The stator coil winding of claim 32, wherein said coil has a substantially rectangular cross-section.

42. A stator coil winding method for use in a motor comprising an output shaft having a rotor coupled thereto and a longitudinal axis, said method comprising:

winding a spiral coil having a plurality of turns therein around an axis generally parallel to the longitudinal axis of said output shaft; and

disposing said coil adjacent said output shaft.

43. The method of claim 42, further comprising:

selectively providing controlling a current having a predetermined direction and magnitude to said coil to control the torque of said output shaft in a degree of freedom.

44. A multiple degree-of-freedom motor comprising:

an output shaft;

first and second stator coils disposed adjacent said output shaft, each said stator coil being a spiral coil having a plurality of turns therein, wherein said spiral coil is disposed adjacent said output shaft and is wound around an axis generally parallel to the longitudinal axis of said output shaft;

a rotor fixed to said output shaft and movably supported adjacent said stator coils with an air gap disposed between said rotor and said stator coils, said rotor including at least one magnet disposed thereon and being movable in directions defining at least first and second degrees of freedom;

wherein energization of the first stator coil by providing current in one direction establishes a magnetic field to urge said output shaft to rotate in a first plane in a clockwise direction, and energization of the first stator coil by providing current in the opposite direction establishes a magnetic field to urge said output shaft to rotate in said first plane in a counter-clockwise direction;

and wherein energization of the second stator coil by providing current in one direction establishes a magnetic field to urge said output shaft to rotate in a second plane in a clockwise direction, and energization of the second stator coil by providing current in the opposite direction establishes a magnetic field to urge said output shaft to rotate in said second plane in a counter-clockwise direction.

45. The motor of claim 44, wherein said second plane is substantially orthogonal to said first plane.

46. A multiple degree-of-freedom motor comprising:

an output shaft movable in directions defining at least first and second degrees of freedom and having a rotor coupled thereto; and

first and second stator coils disposed adjacent said output shaft, each said stator coil being a spiral coil having a plurality of turns therein, wherein said spiral coil is disposed adjacent said output shaft and is wound around an axis generally parallel to the longitudinal axis of said output shaft;

wherein energization of the first stator coil by providing current in one direction establishes a magnetic field to urge said output shaft to rotate in a first plane in a clockwise direction, and energization of the first stator coil by providing current in the opposite direction establishes a magnetic field to urge said output shaft to rotate in said first plane in a counter-clockwise direction;

and wherein energization of the second stator coil by providing current in one direction establishes a magnetic field to urge said output shaft to rotate in a second plane in a clockwise direction, and energization of the second stator coil by providing current in the opposite direction establishes a magnetic field to urge said output shaft to rotate in said second plane in a counter-clockwise direction.

47. A rotor for use in a motor having an output shaft, comprising:

a linkage member adapted for coupling to the output shaft of said motor, said linkage member having only two arms extending therefrom, each said arm coupled to a magnet.

48. The rotor of claim 47, wherein said linkage member is a magnet.

49. The rotor of claim 47, wherein at least one said magnet coupled to the arm of said linkage member is faceted.

50. The rotor of claim 47, wherein at least one said magnet coupled to the arm of said linkage member has a spherical exterior surface.

51. The rotor of claim 47, wherein said arms extend in substantially orthogonal directions relative to one another.

52. The rotor of claim 47, wherein each arm comprises a downward turned portion.

53. The rotor of claim 52, wherein the downward turned portions of said arms lie in planes substantially orthogonal to one another.

54. A motor comprising:

an output shaft;

a stator comprising at least one lamination stack having an interior curved surface and a coil wound thereon, said lamination stack being disposed adjacent said output shaft; and

a rotor fixed to said output shaft and movably supported adjacent said stator with an air gap disposed between said rotor and said stator, said rotor including at least one magnet disposed thereon and being movable along said interior curved surface of said lamination stack in a direction defining a first degree of freedom;

wherein energization of the coil of said first lamination stack establishes a magnetic field to urge said output shaft to rotate in a first plane.